CLAIMS

What is claimed is:

1. A membrane for use in a testing cell to isolate a specimen, said membrane comprising a flexible film having a thickness, said membrane adapted to envelope a specimen, instrumentation embedded in said thickness for measuring a physical property of a specimen.

2. A membrane of claim 1 wherein said physical property being one of the group consisting of stresses, strains, deformation, temperature, soil suction or moisture content.

3. A membrane of claim 1 wherein said membrane has a longitudinal axis and a radial axis, said instrumentation oriented in said membrane to measure said physical property in the longitudinal direction.

4. A membrane of claim 1 wherein said membrane is tubular, said instrumentation oriented in said membrane to measure said physical property in the circumferential direction.

5. A membrane of claim 4 wherein said membrane has a longitudinal axis and a radial axis, said instrumentation

oriented in said membrane to measure said property in the longitudinal direction.

6. A membrane of claim 1 wherein said instrumentation is oriented in multiple directions in said membrane to measure said physical property and calculate Poisson's ratio.

7. A membrane for use in a testing cell to isolate a specimen, said membrane comprising a flexible film having a thickness, said membrane adapted to envelope a specimen, instrumentation embedded in said thickness for measuring strains causing deformation of a specimen.

8. A membrane of claim 7 wherein said membrane has a longitudinal axis and a radial axis, said instrumentation oriented in said membrane to measure strains in the longitudinal direction.

9. A membrane of claim 7 wherein said membrane is tubular, said instrumentation oriented in said membrane to measure circumferential properties in response to stresses.

10. A membrane of claim 9 wherein said membrane has a longitudinal axis and a radial axis, said instrumentation

oriented in said membrane to measure strains in the longitudinal direction.

11. A membrane of claim 7 wherein said instrumentation is oriented in multiple directions in said membrane to measure specific deformation properties to arrive at Poisson's ratio.

12. A membrane of claim 7 wherein said instrumentation includes an instrument for measuring temperature in the specimen.

13. A membrane of claim 7 wherein said instrumentation includes an instrument for measuring moisture content of the specimen.

14. The membrane of claim 7 wherein said instrumentation includes an intrument for measuring soil potential.

15. A method of manufacturing a flexible membrane with cavities to receive instrumentation comprising the steps of providing a mold having an inside wall, an outside wall, and an end wall between said inside wall and said outside wall, forming openings in said outside wall, attaching mold plates to said outside wall, said mold plates extending toward said

inside wall, attaching flats to said mold plates, said flats including mold cavity components disposed within said mold plates, said flats closing said openings, adding a membrane material to said mold between said inside wall and said outside wall, curing said membrane material, removing said flats, said mold cavity components and said mold plates.

16. A method of claim 15 wherein said mold is circular.

17. A method of claim 15 wherein said mold is rotated to dispose said membrane material uniformly about said inside wall and within said mold plates.